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ABSTRACT

The report's brief introduction describes the application of T-4G methodology to the T-37 instrument phase of undergraduate pilot training. The methodology is characterized by instruction in trainers, proficiency advancement, a highly structured syllabus, the training manager concept, early exposure to instrument training, and hands-on training. The introduction also describes the results of a test of the methodology, in which one particular flight training class required an average of 42 percent fewer flying hours (8.8 aircraft hours) than are included in the regular T-37 instrument syllabus. The bulk of the report consists of an appendix whose first part consists of discussions of problems associated with the T-4G Methodology T-37 Syllabus, instructor pilot reactions to the syllabus, results of the application of the syllabus, grade adjustment information for the test population, and recommendations. The bulk of the appendix (60 pages) consists of the syllabus which includes special instructions, task objectives, and performance criteria for the following areas of T-37 flight training: flying training; contact training; instrument trainer training (including basic instruction, basic maneuvers, radio navigation, radar, and mission profile); instrument flight training; navigation training; and formation training. An additional appendix presents a flow chart of the regular against the test syllabi. (JR)

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T-4G METHODOLOGY: UNDERGRADUATE PILOT TRAINING T-37 PHASE

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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This technical report was submitted by the Flying Training Division, Air Force Human Resources Laboratory, Williams Air Force Base, Arizona 85224, under project 1123, with Hq Air Force Human Resources Laboratory (AFSC), Brooks Air Force Base, Texas 78235. Mr. James F. Smith was the project scientist.

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Results of an earlier study indicated that revised instructional methodologies could be used to save a significant number of T-37 aircraft hours when applied to the instrument training phase of Undergraduate Pilot Training (UPT).

To determine the operational feasibility of adopting these methodologies command-wide, Headquarters, Air Training Command directed the 82d Flying Training Wing, Williams Air Force Base, Arizona, in consultation with AFHRL, Flying Training Division personnel, to train a total UPT class using the revised procedures. ATC further directed similar procedures be applied to advanced T-38 UPT on a test basis.

Item 20 (Continued)

This report summarizes the methods used in the T-37 phase of the project and includes a copy of the revised syllabus, the ATC–prepared evaluation report, and associated schedules and flow charts.

The potential savings demonstrated in this study averaged 42% (8.8 T-37 hours) per student for the instrument training phase and it is recommended that favorable consideration be given to command-wide application.

PREFACE

This research was completed under project 1123, United States Air Force Flying Training Development; Task 112303, the Exploitation of Simulation in Flying Training; Work Unit 11230315, Application of T-4G Methodology to T-4/T-37 and T-26/T-38 Syllabi. Mr. James F. Smith was the project scientist and Mr. Robert Woodruff was the task scientist. The report covers research performed between July 1973 and May 1974.

The authors wish to express appreciation to the 82d Flying Training Wing, Williams Air Force Base, Arizona, for their cooperation in the conduct of the study.

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T-4G METHODOLOGY: UNDERGRADUATE PILOT TRAINING T-37 PHASE

I. INTRODUCTION

Air Force Human Resources Laboratory (AFHRL) (Flying Training Division, Williams AFB, Arizona) studies have demonstrated that innovative training methodologies used together with a flight simulator having limited visual and motion capabilities (the T-4G), can produce a significant reduction in aircraft training hours required to complete the Undergraduate Pilot Training (UPT) syllabus. It has also been shown that these same training methodologies can be used with conventional T-4 instrument procedures trainers to produce comparable savings in the T-37 instrument phase (Woodruff & Smith, 1974).

To determine the operational feasibility of adopting "T-4G Methodology" command-wide, Headquarters, Air Training Command (ATC) directed the 82d Flying Training Wing (82d FTW), Williams Air Force Base, Arizona, with assistance from AFHRL, Flying Training Division personnel, to train a total UPT class using this new methodology in available instrument procedures trainers. (ATC also directed that application of T-4G methodology be tested for implementation in the T-38 phase of UPT.)

The T-37 total class test program has been completed using Class 75-03 and results are described subsequently. A report submitted by the 82d FTW to ATC is included as Appendix 1.

II. T-4G METHODOLOGY

A brief description of T-4G methodology as modified for the implementation study follows:

Instructor Pilots Instruct in Trainers. Ordinary UPT instruction in instrument trainers is given by enlisted technicians. Use of technicians with a simulator as sophisticated as the T-4G did not seem appropriate since technicians would not be qualified to properly incorporate the display and motion cues which would be provided. Therefore, instructor pilots (IPs), who understood all aspects of instrument flight training, were used to guide the student's learning process in the T-4G. This was also found to be beneficial in the T-4.

Proficiency Advancement. Ordinarily in UPT, students progress through the syllabus of instruction in "lockstep" fashion, practicing tasks in prescribed sequence for prescribed amounts of time. Since the objective of this study was to reduce the requirement for aircraft hours, this lockstep procedure could not be used. Each student progressed through the syllabus on a proficiency basis in both the ground trainer and the aircraft. Although this procedure was necessary to accomplish the desired evaluation, it is also judged a desirable technique since it permits consideration of individual differences between students.

Highly Structured Syllabus. The special syllabus written for the original T-4G studies (Rust, Smith, & Woodruff, 1974) was revised to reflect experiences gained in the earlier project for this implementation. The syllabus consisted of a sequence of carefully defined learning objectives which could be achieved by the accomplishment of one or more fully described instructional tasks. The description of each task specified pre-flight and in-flight activities, advancement criteria, and library/learning center references. The syllabus outlined exactly what was expected of the student, when it was expected, and the best way to prepare.

Training Manager Concept. Students flew aircraft sorties with the same IPs who were their simulator instructors. This eliminated the need for an IP to use time in the aircraft to assess a student's capabilities before devoting his full attention to instruction. Also, since the students became acquainted with their IPs in the trainer, there was no period of adjustment in the aircraft. Each student's progress was continuously evaluated by his IP; not only in flight training, but also in his understanding of material included in the syllabus. The IPs remained aware of their students' strengths and weaknesses and managed the learning process by tailoring assignments and practice to individual needs. Attention to individual differences was stressed throughout the program.

Instruments First. There is experimental evidence that early exposure to instrument training (i.e., during basic contact) is beneficial (Prophet & Jolley, 1969; Reid, Hagin, & Coates, 1970). Reid et al., state, "Air Force experience supported by training research has demonstrated that learning basic instrument

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flying skills before learning contact flight skills can assist the novice pilot trainee in the acquisition of the latter skills." The concept of part-task training is a theoretical basis for this conclusion since instrument panel cross-check is an integral part of jet contact flying. While this procedure could not be incorporated exactly as it was with the T-4G, the special implementation syllabus was designed to give three T-4 instrument periods before any aircraft flights were made.

Hands-On-Training. A general teaching philosophy of student "hands-on" practice was emphasized in the ground trainer. IP demonstration flying was minimized at all times to maximize the student's opportunity to learn by doing. There is more opportunity to do this in a simulator than in an aircraft because of safety of flight requirements in the air.

The syllabus used in this project, which incorporates the features described above, is a part of Appendix 1 to this report. Appendix 2 is a flow chart comparing the test syllabus and the regular syllabus for the total T-37 training phase of UPT.

III. RESULTS

Savings. Class 75-03 began T-37 training with 64 students. Eight students were eliminated from the program for various reasons prior to solo in the basic contact phase. There were no eliminations during or after the test instrument phase. The 56 students who completed T-37 training required an average of 42% fewer flying hours (8.8 aircraft hours) than are included in the regular T-37 instrument syllabus. Their instrument checkride scores were comparable to those received by previous classes at Williams AFB; their average score was 88.0. Table 1 shows check-ride score, T-4 hours used, and T-37 hours used for each student.

Table 1. **Summary of Student Training Hours and Scores[a]**

	Trainer Hours		Aircraft Hours		
Hours	Used	Saved	Used	Saved	Check Scores
		Flight #1 (N = 30)			
Average	23.1	3.9	11.2	9.5	87.2
Range	19.5-25.7	---	7.7-17.8	---	74.8-95.7
		Flight #2 (N = 26)			
Average	24.2	2.8	12.6	8.1	88.8
Range	21.4-27.0	---	9.4-18.1	---	81.3-95.7
		Total Class (N = 56)			
Average	23.7	3.3	11.9	8.8[b]	88.0[c]

[a]Scores by students are provided in Appendix 1.
[b]Represents a savings of 42%.
[c]Average scores for last 6 classes ranged from 86.97 to 90.15 with a mean of 88.3%.

Instructor Pilots. IPs involved in this study differed widely in flight experience: their total pilot time ranged from 300 to 5,650 hours and their time as instructor pilots ranged from 25 to 1,200 hours. Since each student who completed the program used reduced T-37 hours, it is apparent IP experience was not a major contributing factor. The value of experience was, however, demonstrated since the students of IPs with higher total time and with more instructor time tended to require fewer flying hours. While total time appeared to have more influence than total instructor time, neither of these tendencies reached statistical significance at $p = .05$.

Student Flights. Class 75-03 students were administratively assigned to two regular operational training flights on an essentially random basis. Since members of a UPT flight receive briefings, academics and flying training together, there is much more interaction among IPs and students within a flight than between flights. Therefore, every effort was taken to provide each flight with standard pre-project briefings and with follow-up reminders of the objectives of the project and the instructional methodologies involved. Despite these precautions, there was a significant difference ($p < .05$) between the average hours saved per student in flights #1 and #2; flight #1 saved 46% of the number of aircraft hours scheduled for instrument training in the conventional UPT T-37 syllabus and flight #2 saved 38%. In addition, correlation between student instrument checkflight scores and the flying hours they used reveals that students in flight #1 (.54, $p < .01$) were advanced according to their proficiency much more consistently than were students in flight #2 (−.06). The specific reason for this difference cannot be identified; it has been suggested that IPs in flight #2 believed that additional flying time would benefit their students' scores more than score adjustments awarded based on saved time. (See Appendix 1. NOTE: the variance in scheduling of the two flights, mentioned in paragraph 31 of Appendix 1, is not believed to have contributed to this difference. The trainer time received by each flight was essentially equivalent.) Whatever the true reason for the differences was, it is clear that when proficiency advancement is used, close supervision is necessary to insure that all personnel involved have a thorough understanding of what is required.

IV. CONCLUSIONS AND RECOMMENDATION

This project has demonstrated that a substantial reduction in flying hours required in the UPT T-37 instrument phase can be achieved for an entire UPT class at one base. Problems had been anticipated in areas of IP manning, IP flying requirements, trainer and aircraft scheduling, and scheduling flexibility to accommodate periods of bad weather. However, flexibility designed into the test syllabus alleviated all the anticipated problems.

It is recommended that ATC implement the methodologies used in this study command-wide for T-37 instrument training. The hours saved could be used to teach other training objectives or to provide a significant cost avoidance in undergraduate pilot training. Since this program requires fewer instrument trainer hours per student, its adoption would also assist in stretching out the life of the aging T-4 trainers until new instrument flight simulators become operational.

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APPENDIX 1: REPORT ON IMPLEMENTATION OF T-4G METHODOLOGY IN THE T-37 PHASE OF UNDERGRADUATE PILOT TRAINING

1. *Background*

a. The T-4G arrived at Williams AFB in May 1972. The Air Force Human Resources Laboratory/Flying Training Division (AFHRL/FT – the Air Force Systems Command's pilot training research organization) conducted the T-4G demonstration at the request of ATC. Student training in this project was conducted by ATC T-37 instructors.

b. The T-4G is a T-37 flight simulator with two unique characteristics: (1) it has a 44° x 28° color visual system which simulates a straight-in visual landing from five miles out, touch and go, and the takeoff leg for two miles past the departure end of the runway; and (2) it has a limited motion system which provides ± 5.5° in pitch, ± 8.5° in bank and + 6", – 4" vertical movement.

c. A special syllabus was designed to exploit these unique features of the T-4G simulator. In addition, the syllabus was designed to incorporate special training concepts which have been used effectively in other pilot training research projects conducted by AFHRL/FT, the U.S. Army, the U.S. Navy and selected universities.

d. Results of the first T-37/T-4G study indicated that ten aircraft hours in instrument training could be saved by using both new equipment and revised instructional strategies. The question was then asked, how much of the savings could be attributed to the T-4G device itself, and how much could be attributed to the training techniques or strategies employed in the T-4G syllabus? To answer this question, the next two test groups were divided prior to entering instrument training with half of the group using the T-4G simulator and T-4G syllabus, and half of the group using the current T-4 trainers and the T-4G syllabus. The results of these studies again demonstrated that approximately ten aircraft hours of instrument training could be saved, and that these savings could be achieved regardless of the type trainer used. Thus, it may be safely concluded that by use of the methodologies included in the T-4G syllabus, significant gains in training efficiency could be realized using *existing* UPT equipment.

e. As a result of these research findings (achieved in a joint ATC/AFHRL/FT effort) General Rogers, Vice Commander of ATC, directed the 82d Flying Training Wing at Williams Air Force Base to develop T-37 and T-38 syllabi as necessary to take advantage of these potential increases in training efficiency. Class 75-02 (later redesignated 75-03) was to be the test class to gather data to establish the potential of this training concept.

f. In early July 1973, an ATC study team was organized and the T-37 and T-38 syllabi were revised to incorporate the T-4G methodologies in instrument training.

2. *T-4G Methodology.* A particular method of instrument training was developed during experiments in the T-4G trainer which uses the following concepts:

a. Student Centered – It is oriented toward the individual capabilities of the student. It recognizes that each student is unique and possesses a different learning ability.

b. Proficiency Advancement – This is an integral part of the program and allows the student to progress at his own best learning rate. A fast learner will not be held back by the conventional lock-step syllabus. Slow learners can be identified early and given special help. Proficiency advancement takes place in the instrument trainer and in aircraft.

c. Advancement Criteria – Advancement criteria have been carefully and objectively defined for control of proficiency progression. They are the determinants for decisions to proceed to the next task or maneuver. For example, before a student progresses from straight and level flight to level turns, he must reach a certain proficiency. Before a student progresses from the trainer in basic instruments to the aircraft, he must meet required advancement criteria.

d. Building Block Approach – This gives structure to proficiency advancement and the advancement criteria. This concept requires that the most basic skills be practiced and perfected to specified criteria

before advancement to a more complex task. In other words, we are building from simple to complex and insuring (by use of advancement criteria) that none of the blocks in the foundation are weak.

e. Block Training – Ideally, in block training the student has only one phase of training to worry about at any one time. If he is flying instruments, that is all he will fly until that block of instruction is completed. Necessarily, some exceptions are included to maintain scheduling flexibility but the *goal* is concentrated flying in a single category until proficiency is attained.

f. IP Manager Concept – T-4G methodology requires the IP to give trainer instruction. This is essential if the IP is to effectively analyze his students' strengths and weaknesses. It provides very efficient training because many problems can be identified and ironed out in the trainer before the student reaches the aircraft. Once in the aircraft, the IP can anticipate potential problem areas and insure learning occurs before mistakes happen rather than waiting until they happen, then analyzing the problem, and then giving remedial instruction or practice. Further, in order to let the student try a particular maneuver the first time in the air, you need some assurance that he can, in fact, perform it on the ground; observed trainer performance should provide this in most cases. The instructor pilot acts as the manager of his students' progress through the training program. He makes the decisions on proficiency advancement both in the trainer and the aircraft. He does not advance his student by making arbitrary judgments on his proficiency but, instead, he bases his decisions on whether the advancement criteria have been met. Once met, the student advanced to the next block of training or to the instrument check-ride, if appropriate. Since all trainer rides are given by the instructor pilot he is able to observe at first hand the progression problems of his student.

3. *T-37 Syllabus*

a. The T-4G Methodology T-37 Syllabus differs from the normal syllabus in several ways. The major differences are in the trainer and instrument phases with minor changes in P-missions and pre-contact flying preparation. Beginning with the T-37 syllabus (Atch 1) there are minor changes to the special instructions. T-37 policies and procedures training is basically unchanged except to compress three procedure trainer missions into two missions but with the same total time and the same material covered.

b. Contact training is unchanged; however, the T-4G syllabus includes three basic instrument trainers before the first aircraft sortie. Although there is no firm data on the effect of these trainers on the early contact flying, the consensus among the instructors was that this class was procedurally better prepared and more capable of accepting instruction on the early aircraft missions. They feel this is a result of cockpit familiarity and acquisition of basic cross-check during the three initial trainer sorties.

c. The instrument trainers and instrument portions of the T-4G syllabus are entirely new and different. One of the most important sections is the trainer special instructions. A major and important change is that IPs will give all trainer sorties. All of the basic instrument, basic maneuvers, and VOR missions are .8 hours in length. The single GCA mission and all mission profile sorties are 1.3 hours.

d. Two basic instructional techniques are used in the trainer phase. One is the building block approach to training in which a basic task is followed by a more complex task. Therefore, each task must be taught in numerical sequence and the minimum number of repetitions or advancement criteria met, whichever applies. Paragraph 5 of the Special Instructions describes which blocks of trainers follow the building block approach. Paragraph 6 describes the other basic technique used in the trainers, the non-building block approach. This approach is used with tasks not particularly related or interdependent. This means that each task must be introduced in numerical order and practiced for a minimum number of repetitions before introducing the next task. However, once the initial repetitions are accomplished, proficiency may be obtained in any order desired until all tasks in the block are proficient. In addition to instructions for advancement within each trainer block, there are instructions for advancement from one block to the next (para 7). Proficiency advancement is possible and desirable in the trainer phase, however, it is emphasized that trainer hours are relatively inexpensive if the result is savings in aircraft hours. When the student reaches proficiency in all the tasks, he should be taken to the aircraft. Procedures for handling a weak student are covered in paragraph 9. Paragraph 10 may be difficult to achieve but the trainer personnel could be used to give GCA instructions as an alternative, thus allowing the IP to do his instructional job more completely and give the student valuable training. Block V of the trainers is composed of identical mission profile sorties duplicating the aircraft instrument check ride. As the student progresses through this block, the IP should gradually add complicating factors such as wind, radio chatter, changed clearances, or

restrictions to fully prepare his student for the aircraft environment. When the student goes to the aircraft he should be confronted by very little that he has not already faced in the profile trainer rides. If the trainer is used correctly, the IP should be able to accurately predict the aircraft performance of the student. Finally, proficiency advancement is discussed (para 12). It must be emphasized to the IP that when applying advancement criteria that he also use some judgment remembering that the trainers themselves very often perform poorly.

e. The Table of Contents (pg 35) shows the five trainer blocks, the maximum sorties for each block, and the approximate hours for the maximum number of sorties. Notice that Block I has two different instructional unit designations, (T20XX) and T21XX. Both units consist of the same eight tasks, but the difference is that (T2001) – (T2003) in parenthesis are the pre-contact trainers. The tasks on these first three trainers are practiced only for exposure and not necessarily to proficiency. When the student returns to the trainer on the 20th training day (see Atch 2), he again begins the Block I tasks with a mission symbol of T2101 and practices to proficiency. This is explained in the note on page 36.

f. The format used in the T-4G syllabus is unique and designed to be useful not only for the IP but also for the student (pg 37). The top of the page includes the block number, the instructional unit, T21XX, the number of the tasks in that block (1–8), the maximum number of sorties in the block, and the approximate hours for the maximum number of sorties. Block I is different from the others in that it is used two times–once pre-contact (T20XX) and again when trainer sorties resume. Each task has its own page, this one being TASK 1: Basic Aircraft Control/Response. Next is the Trainer Condition (15,000') followed by the Objective of this task. The student requirements are broken down into pre-flight and in-flight. The pre-flight questions are to be answered by the student before the mission along with other questions the IP feels are appropriate for that mission. The in-flight requirements tell the student exactly what he will be doing on that task in order to help his study. The IP instructions give hints to the IP on how to teach the task and what should be emphasized. The next section is the minimum repetitions if there are any for the task. Note that in Block I the minimum repetitions are in parenthesis for the (T20XX) pre-contact sorties. Below that are the minimum repetitions for the T21XX group of tasks. The next heading is Advancement Criteria, if any apply to the task. Following this are the items included in the cross-check used in accomplishing the task. The final items are the references to study materials down to the exact page. This format incorporates ideas evolved from many test classes and has proven very effective. It is particularly useful for the student since it eliminates the need for him to hunt through reference material and specifies exactly what is expected of him from day-to-day. From the IPs personel observance of his student's performance in the trainer he can tell the student approximately how many tasks they will cover on the next mission. With this information the student can stay ahead in his preparation and each mission should be totally productive.

g. Blocks II, III and IV follow the same format.

h. Block V consists of a maximum of seven mission profile sorties. Each is basically identical, however, as the student gains proficiency the situation will be made more complex to simulate real-world conditions. When the IP feels the student has reached proficiency in all the tasks, he should take him to the aircraft.

i. The next sortie a student flies after leaving the trainer is a mission profile exactly like the last trainer rides he flew (pg 69). The special instructions describe each aircraft instrument sortie as a mission profile (para 1) and discuss proficiency advancement (para 3). Paragraph 4 states that all rides in the I21XX block must be flown unless the student is ready to check before the end of the block, thus by-passing the I22XX block. This is to preclude an IP eliminating rides in the I21XX block, having his student's progress deteriorate, and running out of sorties in the I22XX block with the student not ready to check. The reason, then, for two blocks of identical sorties is for student management. While transfer of skills from the trainer to the aircraft will normally be good, occasionally, a student needs extra time on basic maneuvers early in the I21XX block. It is the IPs option to return to the trainer for additional review rides if necessary. In Block I22XX, when the IP is satisfied with the student's performance, he will send him for a check ride.

j. The navigation phase is unchanged except that an N2301/02 out-and-back mission was added to be used, if necessary, for further training and to bring a student up to minimum T-37 phase time. It was

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used in the test class at Williams AFB to increase flying continuity during a six-weeks time extension forced on the class.

k. The formation phase was unchanged except that an F2401 sortie was added for the same reasons as the N2301/02 described previously.

l. The flow chart (Atch 2)[1] shows three pre-contact trainers followed by a fairly concentrated block of trainers beginning about the 20th training day. When weather deteriorated limiting contact flying early in the test class and with no instrument capability available yet, the flow was revised. The schedulers moved the first two trainers (T2101, T2102) to the end of the C22 block, approximately the twelfth training day. Then, after C2303, the schedulers were free to schedule trainers with no restraint. Of course, it was necessary to closely watch continuity to insure aircraft hour savings later on. The option to use this revised flow is recommended as it would greatly help the weather flexibility of the syllabus. The test class pushed one group of stronger students far ahead in trainers to complete them creating a weather option sooner in the aircraft scheduling. If the weather would close down contact operations, this group could continue to fly in instruments while the second group caught up in the trainer. Again, this must be controlled carefully to insure continuity.

m. Grading in the *trainer* phase is normal for the overall grade but entirely different for the maneuver grade. An overlay for the Form 1500 (see Atch 3)[2] allows grading of maneuvers only as PASS or FAIL; the criteria are met or they are not. The tasks are arranged on the overlay as they occur in the syllabus. There is no change from the present syllabus for grading aircraft sorties.

n. New maneuver item files were prepared for the trainer and instrument categories of training (see Atch 4).[2] A Master Syllabus Listing was also written for the syllabus (see Atch 5).[2]

4. *Problem Areas*

a. A problem came up early concerning utilization of trainers. The simulator personnel were hampered during the study by their method of accounting for time in the trainers. Since many trainer missions were designed for a .8 sortie length they did not mesh with the 1.5 sortie length traditionally used for scheduling links under the normal UPT syllabus. As a result, the link period was not being used to capacity. To solve the problem, we ordered two periods (3.0 hrs) and scheduled three .8 sorties or two 1.3 sorties (mission profiles) which made everybody happy.

b. Another potential problem was solved by writing "ground rules" for the guest help IPs from Academics and Training Officer shops. Because of the importance of continuity between the IP and student in the trainer and instrument portions of the syllabus, the guest help IPs were told that in order to fly instrument sorties with their student they had to fly the trainer sorties with him also, as all the other IPs would do. When the class was completed these IPs were interviewed. Their reaction was positive in that they felt more secure in knowing they would get their sortie requirements without a great deal of effort seeking them out. They still felt some flexibility was necessary for performance of their jobs, but they said carrying one student using this syllabus was no problem for them.

c. One extra sortie was added to the aircraft block as an I2301. This was directed locally by the DO in response to an IG writeup on the lack of proficiency of T-37 students in precision approaches. This 1.3 hour GCA ride is included in all data on the class. In addition, beginning with this class, a precision approach was flown on the instrument check instead of the previous surveillance approach. This affected all the T-37 classes, not just 75-03. In order to prepare the student adequately for the check ride, through local arrangements, each student flew a precision approach on most of the mission profile aircraft rides. This was possible because of the greatly decreased number of sorties being flown in the squadron at that time.

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[1] Removed—refer to Appendix 2.

[2] Removed—forms not of general interest; maneuvers taught are listed but these may be found in the syllabus, Attachment 1.

Normally, a requirement for the number of precision approaches flown would have caused a serious conflict with the normal VFR operations.

d. An important problem occurred with the necessity for rebriefing key points in the syllabus and the management of the class. Even with a thorough initial briefing, it is important to rebrief key items several times. For example, at the beginning of each trainer block the progression philosophy of the block needs to be rebriefed. The idea of the "building block approach" as used in Blocks I, III, and IV must be reviewed. Proficiency advancement must be constantly discussed to insure that all IPs are in that frame of mind—an attitude foreign to them up to now. The key to the successful implementation of this syllabus is careful management, particularly at the flight level. The flight commander must have a thorough understanding of the methodology and he must watch the progress of the students carefully just as he must with the present syllabus.

e. The IP manning in the two flights involved in 75-03 are representative of the current manning in the T-37 squadron at Williams. With the exception of the flight commander, assistant flight commander, scheduler, and guest help who need to fly only one student, all of the IPs can carry two students using this syllabus. This takes into account performing all normal additional duties.

5. *Instructor Pilot Reactions*

a. Several problems were anticipated during the writing of this syllabus. The first one was the IP dislike for giving so many trainer sorties. Another was less flying time for the IPs. Finally, there was the problem of an IP giving the student more aircraft sorties so he could get a higher check ride score.

b. Initially, the reactions of IPs were mixed, as would be expected. Early in the class the first indications that the IPs liked the syllabus began to occur. The IPs first mentioned that the .8 hour length of the early trainers was ideal both for student training and IP adaptability to giving so many trainer sorties. Following this they expressed that they were anxious to take the student to the aircraft because the idea of beginning the first aircraft sortie with a full mission profile was intriguing. They particularly agreed that the place to teach all basic instruments was in the trainer and not the aircraft.

c. The instructors were also surprised to discover how proficient a student could become in the trainer all the way through advanced instruments. IPs found themselves giving all the effective real-world hints for flying instruments they knew from experience. They also found themselves working harder with their students in the trainer when they realized that the more problems they solved there, the easier job they would have in the aircraft. It would be difficult to deny their point that the instructor pilot is more qualified than the most professional of enlisted instructors when it comes to teaching instrument flight procedures and techniques.

d. Both flight commanders stated that they would gladly use this syllabus again and felt it was valuable. The schedulers mentioned that they thought they had the problems worked out and that next time it would be relatively easy to schedule. It was unanimously agreed that the three pre-contact trainers were very beneficial in making the first aircraft sorties more productive. As a result, the two flights involved in this test have adopted the idea of the pre-contact trainer missions and are scheduling practice links for that purpose with their new class which is under the normal syllabus.

e. In general, the IPs were very surprised at how proficient their students were on the early aircraft rides. They found that the time spent in the aircraft was more enjoyable as they did not have to teach basic instruments there. The good students were performing extremely well after only three or four sorties. The feeling of the IPs about the aircraft portion of the syllabus was very good and most regretted having to return to the old system with the next class.

f. When the IPs understood that their student had more to gain by saving hours than from flying extra sorties in hopes of increasing the check ride score slightly, they did not hesitate to advance their students to the check ride early.

6. *Foreign Students.* Two Iranian students were in this class. Their performance was better, we feel, than with the normal syllabus. This might be attributed to the fact that with communication being a major problem for them, flying the trainer and the aircraft with the same IP might have created a better rapport in the cockpit thereby enhancing learning. It is a distinct possibility that they found it easier to accept instruction from an officer rather than an enlisted man.

7. *Results*

a.	Standard UPT Syllabus –	Aircraft Sorties	16.00*
		Aircraft Hours	20.7
		Trainer Hours	27.0
b.	T-4G Syllabus –	Aircraft Sorties	12.0*
		Aircraft Hours	15.6*
		Trainer Hours	24.0
c.	Results of 75–03 Test Class –	Aircraft Sorties	8.77*
		Average Hours Used	11.87*
		Trainer Hours	23.66**

d. Average savings from normal UPT syllabus: 8.33 hours saved for a 42.65% reduction of time required in instrument category of training.

e. Average check score: 88.00.

f. Check scores for last six classes:

74–03	87.22
74–04	88.40
74–05	86.97
74–06	88.55
74–07	90.15
75–02	88.92

Flight Nr 1

STUD	A/C HRS	TNR HRS	CHECK SCORE	STUD	A/C HRS	TNR HRS	CHECK SCORE
1	7.7	20.3	93.0	16	8.2	21.6	88.7
2	9.8	22.9	83.0	17	9.9	20.5	89.6
3	10.0	25.6	78.7	18	16.2	24.2	74.8
4	7.7	21.6	87.4	19	12.9	21.6	91.3
5	11.1	25.7	87.8	20	11.4	23.5	92.6
6	8.8	22.9	87.4	21	11.1	24.7	85.7
7	10.3	22.4	89.5	22	14.4	24.2	90.0
8	8.4	22.6	89.1	23	11.1	21.3	93.5
9	9.0	24.6	89.1	24	13.0	25.7	82.2
10	8.9	22.7	87.0	25	8.3	23.1	88.3
11	9.3	22.8	88.3	26	15.3	25.0	92.6
12	8.0	19.5	95.7	27	14.5	25.5	80.4
13	8.0	21.4	91.3	28	16.1	22.0	80.4(Iranian)
14	9.5	22.9	91.7	29	15.5	22.8	85.6(Iranian)
15	13.4	25.0	82.6	30	17.8	25.5	78.6

*Aircraft sorties and hours do not include the check ride sortie.

**Trainer hours closely parallel the T-4G syllabus because the Christmas break came during the trainer phase and extra time was used to insure continuity.

Flight Nr 2

STUD	A/C HRS	TNR HRS	CHECK SCORE	STUD	A/C HRS	TNR HRS	CHECK SCORE
1	11.1	24.0	82.6	14	15.7	25.5	88.7
2	9.7	21.4	91.4	15	10.3	21.6	87.8
3	12.4	24.1	87.4	16	12.8	22.9	87.0
4	10.3	22.4	95.7	17	17.2	25.5	83.4
5	11.7	25.5	85.2	18	17.7	24.2	90.9
6	13.2	25.5	91.3	19	13.7	25.5	89.6
7	10.7	21.6	91.7	20	18.1	24.2	88.7
8	11.3	25.5	83.0	21	11.4	22.9	91.3
9	10.3	25.5	92.2	22	12.3	27.0	87.4
10	11.0	26.3	86.5	23	9.4	24.2	81.3
11	13.5	25.0	92.6	24	10.1	22.9	91.7
12	13.6	24.2	89.3	25	13.7	22.7	88.7
13	13.9	25.0	93.9	26	11.8	24.0	90.4

8. *Grade Adjustments.* Since students in Class 75-03 were advanced in the T-37 on a proficiency basis, some received less flying time than others. A correction was made to the students' check ride scores to compensate for this. It was done to motivate the students and IPs to save flying hours (fears that less flying time would result in lower check ride scores were alleviated). The correction technique used for Class 75-03 was different from that used in earlier T-4G demonstrations when T-4G students' grades had to be made comparable to grades of their non-T-4G-trained classmates. Since, in the case of 75-03, a whole class was involved it was only necessary to devise a check ride grade correction based on flying time saved; it was not necessary to achieve comparability with grades from other student groups. The technique used was to cast the T-37 flying hours saved by all the students of Class 75-03 into a normal distribution and to assign each student a correction factor based on his deviation from the distribution mean. This is essentially the technique used by professors who grade on the curve. The correction for each student, plus a constant to eliminate negative deviations, was added to his instrument check ride score. In the event this concept of training is implemented throughout the command, this can be programmed into the computers at each UPT base for automatic consideration of the hours saved by the more advanced students. It should be emphasized at this point that all of the scores in this report are raw scores and have not been adjusted for time saved.

9. *Recommendations.* The results of this study indicate that this method of instrument training is superior to that which is presently employed in Undergraduate Pilot Training. The recommendation is, therefore, to implement this training concept as soon as possible. Further, it is recommended that at least two officers representing ATC/DOT and ATC/DOY be sent TDY to Williams AFB to attend a conference where direct contact can be made with the flight schedulers, Research Support Division personnel and others who have been involved with this program with a view toward increasing their knowledge of T-4G Methodology.

5 Atch
1. T-37 Test Syllabus
2. Flow Chart
3. Trainer Form 1500 w/Overlay
4. Instr & Tng Maneuver Item Files
5. ATC Master Syllabus

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SECTION III

T-37 FLYING TRAINING

T-37 FLYING TRAINING

Special Instructions

1. Local sorties are normally planned for 1.3 hours or less. Syllabus lesson objectives may be combined provided the student achieves a satisfactory performance level on all previous requirements. Overfly of sortie length is authorized to combine lesson objectives, provide necessary range, and for optimum utilization of the local area.

2. Crosswind takeoff and landing techniques will be stressed throughout training. Students will be satisfactory in the use of the Flight Manual Takeoff and Landing Crosswind Chart prior to solo, and will be required to refer to the chart prior to flight when crosswind conditions are reported.

3. Students are required to wear equipment normally worn in the aircraft on all Procedure Trainer lessons. This includes helmet, oxygen mask, gloves, and parachute harness.

T-37 POLICIES AND PROCEDURES TRAINING

Special Instructions

1. Cockpit procedure trainer lessons will be given by Instructor Pilots (except P2603) in the Instrument Flight Trainer. All other P-Missions will be accomplished using Learning Center facilities and/or equipment and may be supplemented with IP briefings where deemed appropriate. Under normal circumstances, the student will complete applicable Learning Center P-Mission programs prior to accomplishing the tasks/maneuvers in the corresponding trainer/flying block of instruction.

2. In cases where nonavailability of software and/or unforeseen scheduling problems occur, IP briefings will be substituted to fulfill P-Mission requirements. Those briefed items will be signified by placing the letter B prior to the date in the date viewed block of the ATC Form 894.

3. Those items denoted by * will be briefed or covered in Local Learning Center programs; see your local program listing for appropriate identifier codes. Those items denoted by ** will be covered in Learning Center Support Division programs at a later date. These items will be covered by IP briefings until the programs are available in the Learning Center.

Instr Unit	Title and Objectives	Hours
P2101	A. POLICIES The student will complete the applicable program or be briefed by the Flight Commander (or his representative) on:	1.5
*	- Policies, objectives and expected standards	
*	- Local policies and regulations to include the FCIF	
*	- Flight policies	
*	- Daily flight operations	
*	- Instructor policies	
*	- Use of the Learning Center	
*	- Flying safety precautions and local flying hazards	
*	- Outstanding safety record of the T-37	
*	- Student-instructor relationship	
S7P 621	- Integrity	
	B. AIRCREW DISCIPLINE The student will complete the applicable programs or be briefed on:	
*	- Aircraft Noise Problems a. Effect on civilians in homes, schools, hospitals, etc. b. Effect on maintenance personnel c. Effect on aircrews	
*	- Care and vigilance necessary during ground operations	
*	- Necessity for traffic patterns to satisfy both operational and relations demands	
*	- Sound judgment during takeoffs, approaches, and traffic patterns	
	C. FLIGHT-LINE PUBLICATIONS The student will complete the applicable programs or be briefed on:	
S7P 615	- ATC-Manual 51-4, Primary Flying, Jet	
S7P 615	- Flight Manual, T-37	
S7P 615	- Flight Crew Checklist, T-37	
S7P 615	- AFM 51-37	
S7P 615	- AFM 60-16	
*	- Inflight Guide	
*	- Local flying directives	
*	- Local Area Map	

Instr Unit	Title and Objectives	Hours
P2201	PROCEDURES The student will complete the applicable programs or be briefed on: * - Local departure procedures * - Local recovery/traffic entry procedures S7P 603 - Exterior inspection S7P 604 - Interior inspection to include visual signals used by pilot and ground crew S7P 600 - AFTO Form 781, Preflight Inspection S7P 601 - Engine Starting Procedures S7P 602 - Operation of UHF, VOR and Transponder S7P 606 - Effect and use of the controls (Control stick, trim, throttles, speed brake, gear, flaps, proper use of brakes and nosewheel steering) * - Local radio/taxi procedures and before T/O check S7P 605 - Before Taxi checks S7P 618 - Composite flight to include clearing S7P 617 - PRICE check S7P 619 - Ejection Procedures S7P 620 - Ground Egress Procedures (normal and emergency) S7P 607 - Inflight checks S7P 614 - VOR orientation to include homing S7P 608 - After landing checks S7P 608 - Engine shutdown S7P 608 - Before leaving aircraft * - AFTO Form 781, Postflight	4.0
P2202	COCKPIT PROCEDURES TRAINING: NORMAL PROCEDURES 1. The student will PRACTICE the following using the T-37 Flight Crew Checklist where applicable: - Adjustment of seat and rudder pedals - Interior Check - Engine Starting Procedures - Operation of Radio and Intercom - Before Taxiing check - Before Takeoff check - Lineup check - Operation of landing gear, wing flaps, trim switches, speed brake and nosewheel steering - Fuel procedures - Inflight checks to include the challenge and response method on life support items	1.5

Instr Unit		Title and Objectives	Hours
		- VOR orientation - After landing checks - Engine shutdown - Before leaving aircraft procedures - Ejection and ground egress procedures (do not physically raise ejection seat arming handles) 2. The student will be DEMONSTRATED local Category V/VI departures and arrivals, if applicable (VOR procedures as required)	
P2301		BASIC CONTACT (Part I) The student will complete the applicable programs or be briefed on:	2.5
	FM 40	- Takeoff	
	*	- Local field routes and landmarks	
	*	- Auxiliary Field routes and landmarks	
	*	- Local contact area and landmarks	
	**	- Turns (shallow, medium and steep bank)	
	**	- Tech Order climb and level off	
	**	- Descents and level off	
	FM 28	- Slow flight	
	FM 27	- Traffic Pattern stalls	
	FM 29	- Power-on stalls	
	FM 35	- Abnormal flight attitude recoveries	
	FM 83 & 85	- Normal traffic patterns	
	FM 23	- Traffic pattern go-arounds to a closed pattern	
	FM 21	- Local Flying area	
P2302		BASIC CONTACT (Part II) The student will complete the applicable programs or be briefed on:	1.5
	FM 87	- Simulated single engine pattern and landing	
	FM 90	- No-flap pattern and landing	
	FM 20	- No-flap straight-in approach	
	FM 89	- Normal straight-in approach	
	**	- No-flap traffic pattern stalls	
	FM 25	- Normal spin and recovery	
	**	- Spin prevention	
	S7P 613	- Landing irregularities	
	**	- Stability demonstration	
	*	- Mission planning	
	FM 22	- Crosswind techniques	

Instr Unit	Title and Objectives	Hours
P2303	ADVANCED CONTACT The student will complete:	1.4
FM 37	- Maximum performance climbing turn	
FM 30	- Lazy Eight	
FM 39	- Aileron Roll	
FM 38	- Loop	
FM 32	- Immelmann	
FM 33	- Cloverleaf	
FM 31	- Barrel Roll	
FM 34	- Cuban Eight	
FM 36	- Split "S"	
P2401	BASIC INSTRUMENTS (Part I) The student will complete the applicable programs or be briefed on:	1.3
**	- Pitch, bank, and power	
**	- Crosscheck and use of trim	
**	- Change of airspeed - straight and turning	
S7I 302	- Constant airspeed climbs and descents	
**	- Level off	
S7I 306	- Turns and turns to headings	
P2402	BASIC INSTRUMENTS (Part II) The student will complete the applicable programs or be briefed on:	1.5
**	- Instrument takeoff (hooded)	
**	- Tech Order climb and level off	
**	- Rate climbs and descents	
**	- Vertical S A, B, C, D	
S7I 301	- Steep turns	
**	- Confidence maneuvers	
**	- Unusual attitudes	
*	- Inspection items peculiar to instrument flight	
P2403	BASIC INSTRUMENTS (Part III) The student will complete the applicable program or be briefed on:	.3
**	- Radar approach	

Instr Unit	Title and Objective	Hours
P2404	ADVANCED INSTRUMENTS (Part I) The student will complete the applicable programs or be briefed on: * - Local instrument area procedures (advanced) ** - VOR Course Interceptions (RMI) only and Course indicator and RMI procedures ** - Maintaining course ** - Proceeding direct to a station and station passage ** - VOR holding ** - VOR penetration and low approach ** - Landing from an instrument approach ** - Missed approach ** - ATC voice procedures to include clearance, departure, enroute and approach	1.4
P2405	ADVANCED INSTRUMENTS (Part II) The student will complete the applicable programs or be briefed on: ** - Procedure turns ** - Turbo jet enroute descent * - IFR emergency procedures ** - Single engine instrument approaches ** - Surveillance Radar Approach * - Local instrument check profile	1.4
P2501	PRESOLO PREPARATION The student will complete the applicable programs or be briefed on: S7P 609 - Boldface emergency procedures S7P 610 - Checklist emergency procedures * - Inflight guide emergency procedures * - Lost procedures to include VOR orientation S7P 612 - Aircraft restrictions and limitations S7P 611 - Flight discipline * - Solo Diversion Procedures	1.5
P2601 02 03	COCKPIT PROCEDURE TRAINING: PROCEDURES REVIEW - The student will review normal procedures as deemed necessary. - On P2601 and 02 the student will demonstrate a satisfactory level of performance on critical item emergency procedures and all other noncritical emergency procedures in the flight crew checklist.	3.5

Instr Unit	Title and Objective	Hours
	- P2603 is a 1.5 hour nongraded review lesson and will be accomplished student team with an Instrument Trainer Instructor providing console assistance from outside the cockpit. Each student will perform all critical item emergency procedures. The students will jointly review all noncritical emergency procedures in the flight crew checklist. - Do not physically raise the ejection seat arming handles on any lesson.	
P2701	NIGHT FLYING The student will complete the applicable programs or be briefed on: * - Local night procedures * - Night emergency procedures ** - Spatial disorientation	.5
P2801	NAVIGATION The student will complete the applicable programs or be briefed on: ** - Preflight planning ** - VFR pilotage ** - IFR enroute procedures ** - ATC voice procedures	1.0
P2901	FORMATION The student will complete the applicable programs or be briefed on: FM 41 - Formation takeoff (wing and lead) FM 42 - Fingertip formation FM 43 - Route FM 43 - Crossunder FM 43 - Pitchout and rejoin * - Local formation procedures ** - Visual signals ** - Position change ** - Inflight checks ** - Speed brake operation ** - Air discipline and radio procedures ** - Overshoot	2.0

T-37 CONTACT TRAINING

Special Instructions

1. Normally, students will not be soloed with less than 14 hours instruction. Highly qualified students may solo with 12 hours provided all lesson objectives listed in C2101 through C2501 are met.

2. Students who are having difficulty in the presolo phase must be identified early so that special attention can be given as required before the student progresses to the 19-hour level.

3. Students who have not soloed after 19 hours of dual instruction will be given a progress check. If the student is not cleared for solo by the progress check instructor pilot, elimination procedures will be initiated. Students may be cleared for solo on subsequent final progress check flights and, if soloed, may continue the course in their assigned class. Exceptions to the policy of administering a progress check flight at 19 hours will be made only when overriding factors exist such as extended grounding or loss of training continuity. In those cases where the above factors dictate retaining the student in the program or where faculty board action results in retention, the student will be held over a class rather than continue in his present class.

4. The dual and solo requirements of the supervised solo lesson must be accomplished on the same day. Where possible, the student will use the same aircraft for solo after the dual portion of the lesson has been completed. The instructor will monitor and grade his student from the RSU during the solo portion of the mission.

5. Spins.
   a. Objectives of spin maneuvers are to enable the student to:
      (1) Recognize the conditions that result in spins.
      (2) Achieve a satisfactory level of performance in spin prevention and normal spin recovery.

NOTE: Students will not perform intentional spins after demonstrating a satisfactory performance level on the post solo check. However, the student may be demonstrated a spin recovery on every third dual contact sortie after the post solo check.

6. The student will demonstrate a satisfactory performance level in both right and left single engine and normal traffic patterns before solo. The traffic pattern is defined as being inclusive of the initial, through the pitchout up to and including, the rollout on final. Any deficiencies occurring after rollout on final will be graded in the landing phase. On touch and go landings, deficiencies

occurring after power application will be graded in the takeoff block.

7. Overhead no-flap patterns will normally be flown on missions which specifically call for this maneuver. They need not be repeatedly flown on subsequent missions.

8. Prior to beginning aerobatic training in the C30XX unit, the student will be briefed on the physiological stresses of high performance flying to include the effects of sustained high G-forces and methods of combatting them, and the cause and correction of hyperventilation and hypoxia.

9. Recovery from vertical flight will be taught initially as a planned maneuver. Once the student is satisfactory in vertical recoveries, they will be performed from a variety of flight attitudes.

10. A student will not be scheduled for solo flight unless he has had a dual flight in the preceding seven calendar days on which he performed a satisfactory landing. To ensure compliance with this requirement and the highest possible level of proficiency, the traffic pattern and landing on all dual flights, in all phases should be accomplished by the student unless precluded by safety, training or other overriding considerations.

11. Prior to night flying the student will be briefed on spatial disorientation and unusual attitude recovery procedures, and terrain avoidance to include local minimum safe altitudes.

Instr Unit	Title and Objectives	Sorties Dual/Solo	Approx Hours
C2101	ORIENTATION (PRESOLO) 1. This flight will include familiarization with the local area, auxiliary fields, and prominent landmarks 2. The instructor will DEMONSTRATE: a. Takeoff b. Climb and traffic exit c. Selected aerobatic maneuvers (optional) d. Letdown and traffic entry e. Normal pattern and landing f. Inflight checks g. Clearing h. Mission planning i. T.O. and landing data	1/0	1.2

Instr Unit	Title and Objectives	Sorties Dual/Solo	Approx Hours
	3. The student will PRACTICE: a. Ground operations b. Level off c. Turns (shallow and medium, climbing and descending) d. Radio procedures (including VOR checks and transponder) 4. Special Syllabus Requirements. The Student will be DEMONSTRATED AND PRACTICE: a. Correct throttle technique b. Oxygen procedures c. Effect and use of controls d. Use of trim e. Use of speed brake f. Gear and flap operation g. Composite crosscheck h. Change of airspeed		
C2201 | 05	FAMILIARIZATION (PRESOLO) 1. The student will PRACTICE: a. All maneuvers and procedures previously PRACTICED b. Takeoff c. Climb and traffic exit d. Slow flight e. Turns (shallow, med & steep; level, climbing & descending) f. Traffic pattern stalls g. Power on stalls (incl secondary stalls) h. Inverted recovery i. High speed dive recovery j. Runaway trim k. Letdown and traffic entry l. Normal pattern and landing m. Closed traffic n. Go-around (from final turn and low approach) o. Inflight checks p. Clearing q. Mission planning r. Emergency procedures s. T.O. and landing data 2. The student will be DEMONSTRATED: a. No-flap traffic pattern stalls b. VOR Orientation	5/0	6.5

Instr Unit	Title and Objectives	Sorties Dual/Solo	Approx Hours
	3. Special Syllabus Requirement. The instructor will accomplish the simulated single engine go-around demonstration.		
C2301 02 03	FAMILIARIZATION (PRESOLO) 1. The student will PRACTICE: a. Maneuvers and procedures previously introduced as required to ensure continuity. b. Spin prevention c. Normal spin d. SS pattern and landing e. No-flap pattern and landing f. Straight-in approach (normal and no-flap) g. Vertical recovery h. No-flap traffic pattern stalls i. VOR Orientation 2. At the end of this Instructional Unit, the student must have achieved a satisfactory level of performance on the following maneuvers: a. Ground operations b. Takeoff c. Climb and traffic exit d. Level off e. Turns f. Inverted recovery g. High speed dive recovery h. Inflight checks i. Radio procedures (incl. VOR checks and Transponder) 3. Special Syllabus Requirement. The student will be DEMONSTRATED and PRACTICE the stability demonstration (on one sortie only)	3/0	3.9
C2401 02	FUNDAMENTAL MANEUVERS (PRESOLO) 1. The student will PRACTICE maneuvers and procedures previously introduced as required to ensure continuity 2. At the end of this Instructional Unit the student must have achieved a satisfactory level of performance on all maneuvers previously practiced except:	2/0	2.6

Instr Unit	Title and Objectives	Sorties Dual/Solo	Approx Hours
	a. Normal spin b. No-flap pattern (overhead and straight-in) c. Vertical recovery d. Mission planning e. No-flap traffic pattern stalls f. VOR Orientation		
C2501	SUPERVISED SOLO The student must accomplish the following in a satisfactory manner: a. Blindfold Cockpit Check b. Three dual landings and one go-around c. Three solo patterns and landings	1/2 1/2	1.3

Instr Unit	Title and Objectives	Sorties Dual/Solo	Approx Hours
C2601 02	AREA CHECKOUT 1. The student will PRACTICE maneuvers and procedures previously introduced as necessary, to include at least: a. Spin prevention b. Normal spin c. Straight-in approach (normal) d. SS pattern and landing e. Closed Traffic f. High speed dive recovery g. Vertical recovery h. VOR Orientation i. Traffic pattern stalls j. Slow flight 2. At the end of this Instructional Unit the student must have achieved a satisfactory level of performance on the following maneuvers: a. Normal spin b. Vertical recovery c. Mission planning d. VOR Orientation 3. Special Syllabus Requirements: a. The student will demonstrate satisfactory knowledge of: (1) Local area procedures, to include identification of prominent landmarks and hazards (2) Lost procedures b. The student will PRACTICE at least one simulated strong crosswind overhead pattern and landing using zero flaps	2/0	2.6
C2701	SOLO STAGE The student will perform normal traffic patterns and landings (minimum of four)	0/1	1.2
C2801 | 05	FUNDAMENTAL MANEUVERS (DUAL-SOLO) 1. The student will PRACTICE maneuvers and procedures previously introduced as necessary to ensure continuity. 2. Specific objectives will be briefed to each student prior to solo sorties. Dual sorties will be equitably spaced to provide for a check of progress during solo practice, and continued	3/2	6.5

Instr Unit	Title and Objectives	Sorties Dual/Solo	Approx Hours
	satisfactory performance of dual-only maneuvers		
C2990	POST SOLO CHECK 1. The student will receive this check when approximately 26 hours of contact flight training have been accomplished 2. The student will demonstrate a satisfactory level of performance on a representative cross-section of maneuvers previously practiced except: a. Power-on stalls b. No-flap pattern (overhead and straight-in) c. No-flap traffic pattern stalls d. VOR Orientation e. Blindfold cockpit check NOTE: Spin prevention and normal spin recovery must be flown. 3. The student will demonstrate satisfactory knowledge of all critical action emergency procedures, and a cross-section of noncritical procedures, aircraft systems and operating limitations	1/0	1.3
C3001 | 14	ADVANCED MANEUVERS (DUAL/SOLO) 1. The student will practice: a. Maneuvers and procedures previously introduced as necessary to ensure continuity, except no-flap patterns (overhead and straight-in) and no-flap traffic pattern stalls b. Lazy eight c. Maximum performance climbing turn d. Split "S" e. Loop f. Immelmann g. Cuban eight h. Cloverleaf i. Aileron roll j. Barrel roll	7/7	18.2

Instr Unit	Title and Objectives	Sorties Dual/Solo	Approx Hours
	2. Specific objectives will be briefed to each student prior to solo sorties. Dual sorties will be equitably spaced to provide for a check of progress during solo practice, and continued satisfactory performance of dual-only maneuvers. 3. At the end of this Instructional Unit the student must have achieved a satisfactory level of performance on maximum performance and aerobatic maneuvers listed above		
C3101 02 03	ADVANCED MANEUVERS (DUAL/SOLO) The student will review contact maneuvers as required to ensure continued proficiency	2/1	3.9
C3201	NIGHT FLYING (DUAL) 1. This mission will be accomplished during the hours of darkness 2. The student will satisfactorily complete a blindfold cockpit check 3. The student will PRACTICE: a. Ground operations b. Takeoff c. Climb and traffic exit d. Turns e. Letdown and traffic entry f. Normal pattern and landing (min. of four, one demonstrated and three practiced) g. Go-around h. Emergency procedures (appropriate for night operations) i. Other procedures as required (inflight checks, etc.) 4. Special Syllabus Requirement. The student will be DEMONSTRATED, as required, and PRACTICE identification of local area check points; estimating distances, and use of navigational aids at night	1/0	1.4

Instr Unit	Title and Objectives	Sorties Dual/Solo	Approx Hours
C3390	FINAL CHECK 1. This check will be accomplished after the student has received approximately 50 hours of contact flying training 2. The student will demonstrate a satisfactory level of performance on a representative cross-section of maneuvers previously introduced except: a. Normal spin b. No-flap pattern (overhead and straight-in) c. Runaway trim d. No-flap traffic pattern stalls e. VOR Orientation f. Blindfold cockpit check	1/0	1.3

T-37 INSTRUMENT TRAINER TRAINING

Special Instructions

1. Instructor pilots will conduct all the trainer sorties.

2. Trainer sorties will be scheduled for 0.8 hours for Block I - III; Blocks IV and V will be scheduled for 1.3 hours. Briefing and debriefing time is not included.

3. All tasks are to be thoroughly ground briefed; if PREFLIGHT requirements cannot be met, the task should not be attempted.

4. Instructional Unit (T20XX) in Block I (Basic Instruments) will be accomplished prior to presolo training in the aircraft. Proficiency advancement applies only to the minimum repetitions; all items pertaining to (T20XX) will be listed in parentheses ().

5. In order to advance within lesson Blocks I, III and IV, (Basic Instruments, VOR, and Radar) the student must meet either the minimum repetitions or the advancement criteria for each successive task, whichever applies. The tasks must be accomplished in numerical sequence.

6. In order to advance within Lesson Block II (Basic Maneuvers) the student must first meet the minimum repetitions requirement for a task before being introduced to the next sequenced task. (If the student should meet the advancement criteria for a task before he reaches the minimum repetitions for that task, he should be advanced to the next task immediately.)

7. In order to advance from one lesson block to another, the student must meet:

I to II - the advancement criteria for last task in Block I

II to III - The advancement criteria for all tasks in Block II, plus the increased advancement criteria for the tasks in Block I.

III to IV, IV to V - At least the minimum repetitions for the last task in the block.

8. During a sortie in which the student completes all the advancement criteria for his lesson block, he should be advanced to tasks in the next succeeding lesson block.

9. If a student fails to meet the advancement criteria within an assigned block in the prescribed number of sorties allotted, he will receive an overall grade of UNSATISFACTORY and his status will be reviewed by the flight commander to determine if additional trainer sorties are required.

10. During Block IV (Radar), base GCA personnel will be utilized, if possible, to monitor each radar approach.

11. During Block V (Mission Profile) radio chatter to approximate real world conditions will be fed through the student's headset; winds aloft will be used from the daily weather briefings. These sorties may be instructed from outside the cockpit with the canopy down.

12. Proficiency Advancement:

a. In order to advance the student must:

(1) Remain within the tolerance established in the advancement criteria.

(2) Maintain smooth and positive aircraft control while performing the maneuvers.

b. The parameters of the advancement criteria must be adhered to during each maneuver; however, this does not preclude advancing the student if he momentarily exceeds the criteria, recognizes the deviation, and makes the proper corrections.

TRAINER TABLE OF CONTENTS

Instr Unit	Task/Title	Page	Maximum Sorties	Approx Hours
(T20XX)	BLOCK I - BASIC INSTRUMENTS	III-18	(3)	(2.4)
T21XX	1. Basic A/C Control/Response	III-19	2	1.6
	2. Aircraft Trim	III-20		
	3. Pitch, Bank, Power Relationship	III-21		
	4. Constant A/S Straight & Level	III-23		
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T22XX	BLOCK II - BASIC MANEUVERS	III-28	7	5.6
	9. ITO	III-29		
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	17. VOR Equipment	III-39		
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	TOTAL		25	24.0

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BLOCK I - BASIC INSTRUMENTS
(T20XX)
T21XX

MAXIMUM SORTIES: (3)
2

APPROX HOURS: (2.4)
1.6

TASKS	PAGE
1. Basic Aircraft Control/Response	III-19
2. Aircraft Trim	III-20
3. Pitch, Bank, and Power Relationship	III-21
4. Constant Airspeed, Straight and Level	III-23
5. Change of Airspeed	III-24
6. Constant Airspeed Climbs/Descents	III-25
7. Level Offs	III-26
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NOTE: For (T20XX) the student must accomplish only the minimum repetitions in parentheses in order to progress to the next task; for T21XX the student must meet either the minimum repetitions or the advancement criteria for a task, whichever is applicable, before he progresses to the next task. In order to progress to Block II, the student must therefore successfully accomplish Task 8 in sequence.

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BLOCK I - (BASIC INSTRUMENTS - PRESOLO)
BASIC INSTRUMENTS

Instr Unit (T20XX)	Tasks (1-8)	Maximum Sorties (3)	Approx Hours (2.4)
T21XX	1-8	2	1.6

TASK 1: BASIC A/C CONTROL/RESPONSE

- TNR COND: 15M'

- OBJECTIVE: The student interprets the attitude indicator to make proper pitch and roll corrections in order to establish and maintain an aircraft attitude of wings level.

- STU REQ:
  - PREFLIGHT
    - What indications on the attitude indicator would tell you if you were in a climbing or descending left or right turn?
  - INFLIGHT
    - The student will control the aircraft as directed to perform climbing or descending left or right turns then return the aircraft to wings level with the nose on the horizon in conditions of smooth and rough air; he will accomplish consecutive left and right 30-45° banks while maintaining the miniature aircraft nose on the horizon.

- IP INST:
  - Insure that the student understands the aircraft's position in relation to the real horizon.
  - Concentrate on the attitude indicator.
  - Introduce rough air when the student's performance becomes consistently acceptable.

- MIN REP: (5 Minutes)
  3 Minutes

- ADV CRIT: None

- XCK: Attitude Indicator

- REF: AFM 51-37, Ch 7

BLOCK I (Cont'd)

Instr Unit	Tasks	Maximum	Approx
(T20XX)	(1-8)	Sorties	Hours
T21XX	1-8	(3)	(2.4)
		2	1.6

TASK 2: AIRCRAFT TRIM

- TNR COND: 15M'

- OBJECTIVE: The student trims the aircraft and maintains an altitude with the wings level using the attitude indicator to control the aircraft's attitude.

- STU REQ:
  - PREFLIGHT
    - What is trim?
    - How can good trim make flying easier?
    - How do you trim the three control surfaces?
    - How would you know if the rudder were out of trim?
  - INFLIGHT
    - The student will maintain wings level with the nose on the horizon as he puts the aircraft out of trim and then will retrim to relieve control pressures.

- IP INST:
  - Give the aircraft to the student in level flight trimmed up.
  - Point out the advantages of good trim and how to trim.
  - Introduce altimeter and VVI.

- MIN REP: - (5 Minutes)
  - 3 Minutes

- ADV CRIT: None

- XCK: Attitude Indicator, VVI and Altimeter

- REF:
  - Learning Center: none
  - AFM 51-37, p 7-6 to "Cross Check"
  - ATCM 51-4, Ch 3, p 3, "Trim" and p 4 to "Conditions"; Ch 16 p 4, "Elevators Trim" to "Summary"
  - T.O. IT-37B-1, p 6-4, "Control Trim Tabs", p 1-27, "Aileron" to "Control Lock", p 1-27, Fig 1-17

BLOCK I (Cont'd)

Instr Unit	Tasks	Maximum	Approx
(T20XX)	(1-8)	Sorties	Hours
T21XX	1-8	(3)	(2.4)
		2	1.6

TASK 3: PITCH, BANK & POWER RELATIONSHIP

- TNR COND: 15M'

- OBJECTIVE: The student demonstrates his understanding of pitch, bank, and power relationships by maintaining altitude with wings level, by making correct pitch corrections when necessary, and by altering pitch to change airspeed.

- STU REQ:
  - PREFLIGHT
    - What is a bar width on the attitude indicator?
    - What is VVI lag?
    - If the nose is raised one bar width what would the approximate VVI reading be?
    - At 200 ft above the desired altitude, what should the attitude indicator and VVI indicate during the correction?
    - How does pitch alone affect airspeed?
    - How does power affect airspeed and pitch?
    - Why does bank affect airspeed in a straight and level turn?
  - INFLIGHT
    - The student will maintain an altitude with the wings level and make appropriate pitch corrections when necessary.
    - He will observe how a bar width of pitch change affects altitude and vertical velocity when the IP directs him to change airspeed by pitch change.
    - He will observe the bank demonstration.

- IP INST:
  - Do not require constant airspeed.
  - Stress the need for small changes. Explain that instrument flying is a continuing process of correction.
  - Show how to correct back to desired altitude.
  - Stress patience.
  - If student is making proper correction back to altitude it will always take 30 seconds. Point out that once he has determined that the nose should be raised or lowered to correct back to altitude that the student make the pitch change looking at the attitude indicator. This will help prevent chasing the VVI.

- Introduce A/S indicator, J-2, and RPM gauges.
- Demonstrate how bank affects airspeed.
- Show how to use the throttles.
- Insure student has the aircraft trimmed.

- MIN REP: (8 Minutes)
  5 Minutes

- ADV CRIT: None

- XCK: Attitude Indicator, VVI, Altimeter, A/S, J-2 Tachs

- REF:
  - Learning Center: 003 Pitch, Bank and Power
  - T.O. 1T-37B-1, Fig 1-6
  - AFM 51-37, p 3-20
  - AFM 51-4, Ch 3, p 4 from "Conditions" thru p 7, Ch 16, p 4, "Airspeed Indicator", p 5, "Heading" to p 7, "Cockpit";
  - Learning Center Program - none

BLOCK I (Cont'd)

Instr Unit	Tasks	Maximum	Approx
(T20XX)	(1-8)	Sorties	Hours
T21XX	1-8	(3)	(2.4)
		2	1.6

TASK 4: CONSTANT A/S STRAIGHT AND LEVEL

- TNR COND: 15M' 160 KIAS

- OBJECTIVE: The student maintains the aircraft in straight and level flight.

- STU REQ:
  - PREFLIGHT
    - What is meant by exchanging airspeed for altitude? Give an example in which this principle could be used to correct back to an altitude and airspeed.
  - INFLIGHT
    - Student will fly the aircraft straight and level using power as necessary to hold 160 KIAS.

- IP INST:
  - Have student hold level flight 160 KIAS.
  - Show student what he must crosscheck and how to make corrections.
  - Use problem freeze and have the student explain how airspeed may be exchanged for altitude.
  - Insure that the student attempts to hold a heading. Stress the fact that this task is the most basic instrument maneuver, that it is a difficult task, and requires intense concentration.
  - Point out what and how to crosscheck.
  - Explain how to make corrections.

- MIN REP: (10 Minutes)
  None

- ADV CRIT: (None)
  Alt (±125') A/S (±6K) Heading (+5°) VVI (-600 to +600) Time (1 min increments)

- XCK: Attitude Indicator, A/S, VVI, Altimeter, Tachs

- REF:
  - Learning Center: none
  - T.O. 1T-37B-1, p 5-2
  - AFM 51-37, p 3-8, Fig 3-7, bottom illustration; p 8-4 thru 8-10
  - ATCM 51-4, p 16-1 to 16-4, Bank Control

BLOCK I (Cont'd)

Instr Unit	Tasks	Maximum	Approx
(T20XX)	(1-8)	Sorties	Hours
T21XX	1-8	(3)	(2.4)
		2	1.6

TASK 5: CHANGE OF A/S

- TNR COND: 15M' 160 KIAS

- OBJECTIVE: The student changes airspeed while maintaining altitude and heading.

- STU REQ:
  - PREFLIGHT
    - Keeping straight and level flight, where will the horizon appear as airspeed decreases?
    - As airspeed increases from 160K to 190K during straight and level flight, what will happen to pitch and trim?
  - INFLIGHT
    - The student will practice changes of airspeed.

- IP INST:
  - Stress trim and small pitch changes.
  - Point out what to crosscheck.

- MIN REP: (3+, 3-)
  None

- ADV CRIT: (None)
  Alt (±125') A/S (±6K) Heading (±5°) VVI (-600 to +600') Time (must hold parameters 30 sec after the speedbrake is raised or the power is changed to maintain the new airspeed

- XCK: Attitude Indicator, A/S, VVI, Altimeter, J-2, Tachs

- REF:
  - Learning Center - 004 - Basic Instr Maneuvers
  - ATCM 51-4, p 16-11, "Airspeed" to p 16-12, "Constant"

BLOCK I (Cont'd)

Instr Unit	Tasks	Maximum	Approx
(T20XX)	(1-8)	Sorties	Hours
T21XX	1-8	(3)	(2.4)
		2	1.6

TASK 6: CONSTANT A/S CLIMBS & DESCENTS

- TNR COND: 15M' 160 KIAS

- OBJECTIVE: The student performs constant airspeed climbs and descents.

- STU REQ:
  - PREFLIGHT
    - What is the most important instrument in constant A/S climbs and descents?
    - What is the most important control?
  - INFLIGHT
    - The student will practice 2000' step constant airspeed climbs and descents

- IP INST:
  - Use 2000' step climbs and descents
  - Point out instruments used for crosscheck
  - Explain that pitch is the only variable and how it affects airspeed and vertical velocity
  - Explain how to read airspeed indicator (steady, increasing, or decreasing) and how to make pitch corrections

  NOTE: This task may be done in conjunction with Task #7

- MIN REP: (3 Climbs, 3 Descents)
  None

- ADV CRIT: (None)
  A/S (±6K) Heading (±5°) VVI in descent (-300 to 4000') VVI in Climb (+300 to 4000') Time (2000' in climb and descent)

- XCK: Attitude Indicator, A/S. J-2, Altimeter, VVI, Tachs.

- REF:
  - AFM 51-37, p 8-15 to 8-17
  - ATCM 51-4, p 16-12, "Constant" to p 16-13, "Rate Climb"
  - Learning Center: 302 Constant A/S Climbs & Descents

NOTE: TASKS 6 AND 7 MAY BE ACCOMPLISHED SIMULTANEOUSLY

BLOCK I (Cont'd)

Instr Unit (T20XX) T21XX	Tasks (1-8) 1-8	Maximum Sorties (3) 2	Approx Hours (2.4) 1.6

TASK 7: LEVEL OFFS

- TNR COND: 15M'

- OBJECTIVE: The student accomplishes level offs from climbs and descents

- STU REQ:
  - PREFLIGHT
    - How do you determine a lead point for a level off?
    - How can you determine where level flight is on the attitude indicator?
  - INFLIGHT
    - The student will practice level offs, from 2000' climbs and descents

- IP INST:
  - Have the student practice level-offs during 2000' step climbs and descents.
  - Point out the necessary planning to make a level-off

NOTE: This task may be done in conjunction with Task 6.

- MIN REP: (6; 3 from climbs & 3 from descents)
  None

- ADV CRIT: (None)
  Alt (±150) Heading (±5°) A/S (±6K) Level-off lead point (3-15% of VVI) Time (remain in parameters for 30 sec after level off initiation)

- XCK: Attitude Indicator, Altimeter, A/S, Tachs, VVI, J-2

- REF:
  - ATCM 51-4, p 16-8, Level-Off
  - AFM 51-37, p 8-28

BLOCK I (Cont'd)

Instr Unit (T20XX) T21XX	Tasks (1-8) 1-8	Maximum Sorties (3) 2	Approx Hours (2.4) 1.6

TASK 8: 30° BANK TURNS TO HEADINGS

- TNR COND: 15M'

- OBJECTIVE: The student performs level turns to specified headings

- STU REQ:
  - PREFLIGHT
    - How do you determine a lead point for rollout on a heading?
    - When the lead point is reached what instrument do you watch?
  - INFLIGHT
    - The student will practice 30° banked turns to headings

- IP INST:
  - Point out how various degrees of bank affect turn rate at that A/S and altitude.
  - Explain how to determine which way to bank, how to set J-2 and how to determine proper lead points and what instruments to crosscheck during the rollout.
  - Insure student doesn't watch J-2 needle during rollout.
  - Stress good pitch and power control and trim

- MIN REP: (3 left & 3 right)
  None

- ADV CRIT: (None)
  A/S (±6K) Alt (±125') Heading (±5°) VVI (-600' to +600') Time (must remain in parameters for 30 sec after wings level on rollout)

- XCK: Attitude indicator, VVI, A/S, J-2, Tachs

- REF:
  - ATCM 51-4, p 16-8, "Turns" to p 16-9, "Steep"

BLOCK II - BASIC INSTRUMENT MANEUVERS

T22XX

MAXIMUM SORTIES: 7 APPROX HOURS: 5.6

TASKS		PAGE
9.	Instrument Takeoff	III-29
10.	Tech Order Climb	III-30
11.	Vertical S	III-31
12.	Unusual Attitudes	III-32
13.	Steep Turns	III-33
14.	Confidence Maneuvers	III-34
15.	Rate and Timed Turns	III-35
16.	Magnetic Compass Turns	III-36
X	Advancement Criteria	III-37

NOTE: The student must meet the minimum number or repetitions (or advancement criteria, whichever occurs first) for a task before being introduced to the next successive task. After all the maneuvers have been introduced start each mission with an ITO and instrument departure. You may practice all maneuvers done in Block I in addition to the newly introduced maneuvers in Block II on each sortie. Advancement criteria in Block II are not for advancement from task to task but for advancement to Block III and IV.

BLOCK II - BASIC INSTRUMENT MANEUVERS

Instr Unit	Tasks	Maximum Sorties	Approx Hours
T22XX	9-16	7	5.6

TASK 9: ITO

- TNR COND: Active Runway

- OBJECTIVE: The student performs an instrument takeoff

- STU REQ:
  - PREFLIGHT
    - How is an ITO different from a normal takeoff?
    - What flight instruments will you be crosschecking before rotation at 65K?
    - What instruments will you use after rotation?
  - INFLIGHT
    - The student will perform an ITO at the beginning of each sortie.

- IP INST:
  - Stress proper brake release and directional control.
  - Have student make a takeoff
  - Use problem freeze as necessary.
  - Point out the changing crosscheck as the ITO progresses
  - Stress the added emphasis on insuring positive rate of climb before raising gear.

- MIN REP: 3

- ADV CRIT: Directional control (±4 of RWY Heading) Pitch at rotation and liftoff (4-6°) Gear UP (100-110K, positive rate of climb) Flaps up (110K-130K, positive rate of climb, light out in handle) Heading control after liftoff (±4°) VVI (+300-2000'/min) up to 180K

- XCK: Attitude Indicator, J-2, A/S, VVI, Altimeter, Tachs, EGT, gear/flap indications

- REF:
  - Learning Center: FM 40
  - ATCM 51-4, ITO, p 16-7 to 16-8, "Level Off"

BLOCK II (Cont'd)

Instr Unit	Tasks	Maximum	Approx
T22XX	9-16	Sorties 7	Hours 5.6

TASK 10: TECH ORDER CLIMB

- TNR COND: As required

- OBJECTIVE: The student maintains T.O. Climb

- STU REQ:
  - PREFLIGHT
    - What instruments will you crosscheck to control A/S?
  - INFLIGHT
    - The student will perform a T.O. Climb from takeoff to 15M feet MSL. (Local restrictions apply)

- IP INST:
  - Point out the crosscheck involved in maintaining T.O. Climb
  - Insure that the student makes all pitch changes looking at the attitude indicator

- MIN REP: 3

- ADV CRIT: Heading (±4°) A/S (±6K, momentary deviation (5 sec) of 10K with immediate correction) VVI (+300' to 4,000'/min)

- XCK: Attitude Indicator, A/S, Altimeter, VVI

- REF:
  - ATCM 51-4, p 16-7, 16-8

BLOCK II (Cont'd)

Instr Unit	Tasks	Maximum Sorties	Approx Hours
T22XX	9-16	7	5.6

TASK 11: VERTICAL S

- TNR COND: 15M'

- OBJECTIVE: The student accomplishes vertical S maneuvers.

- STU REQ:
  - PREFLIGHT
    - What A/S do you hold in a vertical S?
    - What should your VVI read during the climb and descent?
    - What amount of pitch change in bar width gives the correct vertical velocity?
  - INFLIGHT
    - The student will practice vertical S maneuvers.

- IP INST:
  - Stress the pre-planning necessary to do a vertical S.
  - Stress proper lead points and A/S control during the transition
  - Concentrate mainly on A's and D's
  - Insure student understands B's and C's

- MIN REP: 2 "A", 2 "D"

- ADV CRIT: A/S (±6K) VVI in stabilized climb or descent (±300/min). Max reading during transitions (+1600'). Heading for vertical S-A (±4°) Time (1 climb and 1 descent)

- XCK: Attitude Indicator, A/S, VVI, J-2, Tachs, Altimeter

- REF:
  - Learning Center - 302 Vertical "S", A, B, C, D
  - ATCM 51-4, p 16-14, "Vertical S" to "Confidence Maneuvers"
  - AFM 51-37, p 8-18 to 8-19

BLOCK II (Cont'd)

Instr Unit	Tasks	Maximum Sorties	Approx Hours
T22XX	9-16	7	5.6

TASK 12: UNUSUAL ATTITUDES

- TNR COND: 15M'

- OBJECTIVE: The student recovers from nose high and nose low unusual attitudes

- STU REQ:
  - PREFLIGHT
    - How do you recover from a nose high unusual attitude?
    - A nose low unusual attitude?
    - How do you insure that you don't false start?
  - INFLIGHT
    - Student will practice recovering from unusual attitudes.

- IP INST:
  - Show the student how to recognize an unusual attitude, how to confirm the unusual attitude on the other instruments, and how to make recovery referring to the attitude indicator.

- MIN REP: Two nose high and two nose low

- ADV CRIT: Student recognizes unusual attitude and can make a safe recovery without false starts

- XCK: Attitude Indicator, Altimeter, A/S, VVI

- REF:
  - Learning Center - none
  - ATCM 51-4, p 16-15
  - AFM 51-37, p 9-1 to p 9-4

BLOCK II (Cont'd)

Instr Unit	Tasks	Maximum	Approx
T22XX	9-16	Sorties	Hours
		7	5.6

TASK 13: Steep Turns

- TNR COND: 15M'

- OBJECTIVE: The student accomplishes level 60° steep bank turns

- STU REQ:
  - PREFLIGHT
    - Why do you have to increase back pressure to maintain level flight using 60° of bank?
    - When must you add power?
    - What pitch changes can you expect after roll-in due to precession? How do you rollout?
  - INFLIGHT
    - The student will practice level steep bank turns using 60° of bank

- IP INST:
  - Stress pitch and power coordination
  - Point out the proper crosscheck
  - Emphasize the need to watch the attitude indicator

- MIN REP: Four (two each direction)

- ADV CRIT: Altitude (±200') A/S (±7K) VVI (±900') Time (180°

- XCK: Attitude Indicator, VVI, A/S, Altimeter, Tachs, J-2

- REF:
  - Learning Center S71 301, Steep Turns
  - ATCM 51-4, p 16-9, "Steep Turns" to p 16-10, "Rate Turns"
  - AFM 51-37, p 8-11

BLOCK II (Cont'd)

Instr Unit	Tasks	Maximum Sorties	Approx Hours
T22XX	9-16	7	5.6

TASK 14: CONFIDENCE MANEUVERS

- TNR COND: 15M'

- OBJECTIVE: The student accomplishes aileron rolls and wingovers.

- STU REQ:
  - PREFLIGHT
    - What is the entry A/S and power setting for each of the confidence maneuvers?
    - How high/low should the pitch go on a wingover?
    - Where should the pitch be upon completion of the rollout on an aileron roll?
    - What are the pitch and roll capabilities of the attitude indicator?
  - INFLIGHT
    - The student will observe the IP demonstrations and practice wingovers and aileron rolls

- IP INST:
  - Demonstrate the maneuvers pointing out the appropriate checkpoints
  - Use problem freeze as necessary
  - Have the student practice the maneuver
  - Insure that he has a good understanding of the flight path and what the attitude indicator should look like.
  - Point out that the control pressures required to fly the maneuvers in the trainer will not be exactly the same in the aircraft.
  - Stress constant roll rates

- MIN REP: Aileron roll 4; Wingover 4

- ADV CRIT: Aileron roll - A/S 200-230 on entry, nose thru horizon ±2° smooth roll rate; Wingover - A/S 200-230 on entry, 90° bank prior to nose through horizon, wingtip on the horizon consistently.

- XCK: Attitude Indicator, A/S, Tachs,Altimeter

- REF:
  - AFM 51-37, p 8-20 to 8-21
  - ATCM 51-4, p 16-14, 16-15

BLOCK II (Cont'd)

Instr Unit	Tasks	Maximum Sorties	Approx Hours
T22XX	9-16	7	5.6

TASK 15: RATE AND TIMED TURNS

- TNR COND: 15M'

- OBJECTIVE: The student accomplishes standard rate, half-standard rate, and timed turns to headings

- STU REQ:
  - PREFLIGHT
    - How do standard/half-standard rate turns differ from normal banked turns?
    - How do altitude and airspeed affect bank using standard rate turns?
    - How do you make a timed turn to a heading (more than 30° heading change; less than 30° heading change)?
  - INFLIGHT
    - Student will fly standard and half-standard rate turns at different airspeeds to note the difference in bank; he should calculate and execute timed turns to specific headings using half-standard rate turns

- IP INST:
  - Point out that airspeed and bank angle must be compatible and that altitude must be maintained throughout rate/timed turns for them to be accurate. Emphasize the crosscheck to include the attitude indicator. Reference the bank angle differences for different airspeeds.

- MIN REP: Three standard rate, three half-standard rate, and three timed turns.

- ADV CRIT: None

- XCK: Attitude Indicator, Turn/Slip Indicator, Magcompass, Clock, Altimeter, Airspeed Indicator, VVI

- REF:
  - ATCM 51-4, p 16-10, 16-11

BLOCK II (Cont'd)

Instr Unit	Tasks	Maximum Sorties	Approx Hours
T22XX	9-16	7	5.6

TASK 16: MAGNETIC COMPASS TURNS

- TNR COND: 15M' 15° North Latitude

- OBJECTIVE: The student accomplishes turns using the magnetic compass to roll out on specified headings

- STU REQ:
  - PREFLIGHT
    - How do you lead rollout to N, S, E, and W headings on the magnetic compass?
    - What bank angle should you use?
  - INFLIGHT
    - Student will calculate and execute turns to magnetic compass headings.

- IP INST:
  - Emphasize the importance of smooth rollin and rollout; point out methods for calculating the lead points.
  - Stress the level flight crosscheck to minimize error.

- MIN REP: 5

- ADV CRIT: None

- XCK: Attitude Indicator, Mag Compass, Altimeter, Airspeed Indicator, VVI

- REF:
  - AFM 51-37, p 5-1 to 5-5
  - ATCM 51-4, p 16-11

ADVANCEMENT CRITERIA FROM BLOCK II TO BLOCK III & IV

1. As listed in syllabus for Block II for ITO, Tech Order Climb, Steep Turns, Vertical S, Unusual Attitudes, and Confidence Maneuvers.

2. Criteria for tasks from Block I:

   STRAIGHT & LEVEL - Alt (±100') A/S (±4K) Heading (±4°) VVI (±500') Time (1 min)

   CHANGE OF A/S - Alt (±100) A/S (±5K) Heading (±4°) VVI (±500') Time (must hold parameters 30 sec after speed brake is raised or power is changed to hold new A/S)

   CONSTANT AIRSPEED/CLIMBS & DESCENTS - A/S (±5K) Heading (±4°) VVI in climb (+300 - 3500') VVI in descent (-300 - 3500') Time (2000' each direction).

   LEVEL-OFF - Alt (±100') A/S (±5K) Heading (±4°) Level-off lead point (3-15% of VVI) Time (stay in parameters for one min after power change initiating the level off)

   TURN TO HEADING - A/S (±5K) Alt (±100') Heading (±4°) VVI (-500' to +500') Time (must remain in parameters for 30 sec after wings level on rollout)

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BLOCK III - VOR

References for Block III: AFM 51-37, Ch 11 and Ch 15; ATCM 51-4, p 16-15, "VOR Orientation" to p 16-17, "Radar Approach"

T23XX

MAXIMUM SORTIES: 5 APPROX HOURS: 4.0

TASKS	PAGE
17. VOR Equipment	III-39
18. Homing	III-40
19. Intercepts and Maintaining Course	III-41
20. VOR Departure	III-42
21. VOR Approach	III-43
22. Low Altitude Approaches	III-44

NOTE: The student must meet the number of minimum repetitions for a task before progressing to the next task. Advancement into Block IV will be predicated upon completing the minimum repetitions for each task (meeting the objectives for each task should be accomplished within these minimum repetitions); there are no advancement criteria - proficiency will be established in Block V.

BLOCK III - VOR

Instr Unit	Tasks	Maximum Sorties	Approx Hours
T23XX	17-22	5	4.0

TASK 17: VOR EQUIPMENT

- TNR COND: As required

- OBJECTIVE: The student tunes and identifies both the VOR and DME receivers, performs the VOR check, and verbalizes and demonstrates the relationship of the CDI and RMI

- STU REQ:
  - PREFLIGHT
    - With AC power failure what portion of the VOR equipment will work?
    - What does the head of the RMI needle point to?
    - What operates the heading pointer in the CDI?
    - What is the range of the DME?
  - INFLIGHT
    - The student will practice tuning and identifying the VOR/DME equipment, perform the VOR check, and explain the relationship of the CDE and RMI

- IP INST:
  - Show the student how to tune and identify the VOR/DME equipment. Discuss how the RMI and CDI operate.

- MIN REP: Five Minutes

- ADV CRIT: None

- XCK: N/A

- REF: See Block III cover

BLOCK III (Cont'd)

Instr Unit	Tasks	Maximum Sorties	Approx Hours
T23XX	17-22	5	4.0

TASK 18: HOMING

- TNR COND: As Required

- OBJECTIVE: The student homes to a VOR station

- STU REQ:
  - PREFLIGHT
    - What are the correct procedures for homing?
    - How does wind affect homing?
  - INFLIGHT
    - The student will home to a VOR station

- IP INST:
  - Have the student fly you to a VOR station using the homing procedure
  - Use problem freeze if necessary

- MIN REP: Five Minutes

- ADV CRIT: None

- XCK: Attitude Indicator, RMI, Altimeter, A/S, VVI

- REF: See Block III cover

BLOCK III (Cont'd)

Instr Unit	Tasks	Maximum	Approx
T23XX	17-22	Sorties	Hours
		5	4.0

TASK 19: INTERCEPTS AND MAINTAINING COURSE

- TNR COND: As Required

- OBJECTIVE: The student flies to the appropriate headings to make RMI only and normal course intercepts; he maintains course using RMI only and normal methods.

- STU REQ:
  - PREFLIGHT
    - What are the correct procedures for CDI and RMI, and RMI only, intercepts inbound and outbound?
    - How does wind affect these intercepts?
    - What is an intercept angle?
    - How is the intercept completed?
  - INFLIGHT
    - Practice CDI and RMI, RMI only (this will include completing the intercepts and maintaining course for two minutes).

- IP INST:
  - Have the student practice RMI only, and normal course intercepts.

- MIN REP: Two of each: RMI in/out, both in/out, both out after station passage

- ADV CRIT: None

- XCK: Attitude Indicator, RMI, CDI, J-2, VVI, A/S, Altimeter

- REF: See Block III cover

BLOCK III (Cont'd)

Instr Unit	Tasks	Maximum Sorties	Approx Hours
T23XX	17-22	5	4.0

TASK 20: VOR DEPARTURE

- TNR COND: Active runway for departure

- OBJECTIVE: The student flies the local instrument departure to the instrument training areas

- STU REQ:
  - PREFLIGHT
    - What are the frequencies for the VOR stations on the departure?
    - What are the radials and headings used?
    - What are the altitude restrictions and radio calls?
  - INFLIGHT
    - The student will practice the instrument departure to the area.

- IP INST:
  - Observe the student's crosscheck.
  - Point out proper lead points.
  - Use problem freeze to help the student determine his position on the departure.
  - Introduce wind drift.

- MIN REP: 3

- ADV CRIT: None

- XCK: Attitude Indicator, A/S, RMI, CDI, J-2, Altimeter, VVI

- REF: See Block III cover

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BLOCK III (Cont'd)

Instr Unit	Tasks	Maximum Sorties	Approx Hours
T23XX	17-22	5	4.0

TASK 21: VOR APPROACH

- TNR COND: As required

- OBJECTIVE: The student flies a VOR approach including holding and missed approach

- STU REQ:
  - PREFLIGHT
    - How do you determine which way to turn to enter holding?
    - What is the timing used in holding?
    - When do you accomplish the before descent check?
    - What are the procedures at the IAF?
    - When do you accomplish the approach to field check?
    - What are the procedures at the FAF?
    - How do you determine the timing for missed approach?
    - What is the sequence for missed approach?
  - INFLIGHT
    - The student will fly RMI only to the IAF, enter holding, make the VOR penetration, low approach, and missed approach.

- IP INST:
  - Use problem freeze as often as necessary.
  - Break the approach up into separate maneuvers, i.e., holding, penetration, etc.
  - Cover each maneuver thoroughly before tying them all together.
  - Insure that the student has a thorough understanding of each maneuver as well as the overall picture.

- MIN REP: Two for each maneuver - two for the entire approach

- ADV CRIT: None

- XCK: N/A - depends on portion of approach

- REF: See Block III cover

BLOCK III (Cont'd)

Instr Unit	Tasks	Maximum Sorties	Approx Hours
T23XX	17-22	5	4.0

TASK 22: LOW ALTITUDE VOR APPROACHES

- TNR COND: As Required

- OBJECTIVE: The student performs low altitude VOR approach procedures to include procedure turns, holding, low approach and missed approach.

- STU REQ:
  - PREFLIGHT
    - When would you do a procedure turn approach?
    - If you were required to hold, what timing would you use?
    - How do you determine entry turn for procedure turn with and without holding?
    - What IAS will you hold?
    - How do you stay within distance limits without DME, but still allow proper time inbound to perform necessary checks and configure prior to FAF?
    - How and when is the descent performed?
  - INFLIGHT
    - The student will fly a published procedure turn through missed approach and a low altitude holding pattern approach through missed approach

- IP INST:
  - Point out the differences in descent procedures: altitude requirements, on-course requirements, when to begin descents. Brief interpretation of approach plate in preflight planning. Assist student in computing timing and recognizing descent and configuration procedures; stress missed approach procedures

- MIN REP: Two of each

- ADV CRIT: None

- XCK: Include approach plate

- REF:
  - AFM 51-37, Ch 16, p 12-16

BLOCK IV - RADAR

T24XX

MAXIMUM SORTIES: 1 APPROX HOURS: 1.3

TASK	PAGE
23. Radar Approach	III-46

NOTE: Advancement into Block V will be predicated on completing the minimum repetitions for the Radar Approaches; there are no advancement criteria - proficiency will be established in Block V.

BLOCK IV - RADAR

Instr Unit	Tasks	Maximum Sorties	Approx Hours
T24XX	23	1	1.3

TASK 23: RADAR APPROACH

- TNR COND: As Required

- OBJECTIVE: The student accomplishes a precision GCA and surveillance approach

- STU REQ:
  - PREFLIGHT
    - What are the approximate power settings, aircraft configuration and A/S for downwind, base, dogleg, and final?
    - What radio transmissions must be repeated back to the controller?
    - How long can you go without a radio transmission in the pattern and on final before executing the lost communication procedures.
    - What is the difference between a DH and a MDA?
  - INFLIGHT
    - The student will practice precision radar approaches and surveillance approaches.

- IP INST:
  - Alternate as necessary between PAR's and ASR's.
  - Break the approach up into two phases: maneuvering (downwind and baselegs) and final (final, glideslope, missed approach). Point out the differences in these phases between PAR and ASR approaches.
  - Emphasize the correct voice procedures.
  - Mention transition from instrument to VFR and the decisions involved at breakout and DH.
  - Use problem freeze as necessary.
  - Point out the different crosschecks at various points in the pattern.
  - Coordinate with GCA controller as necessary.

- MIN REP: Two PAR - Four ASR

- ADV CRIT: None

- XCK: Attitude Indicator, A/S, J-2, VVI, Altimeter, Tach, Gear & Flap Indications

- REF: AFM 51-37, Ch 16; Learning Center P2602, Surveillance Radar Approach; ATCM 51-4, p 16-17, "Radar" to p 16-18, "Voice Procedures"

BLOCK V - MISSION PROFILE

T25XX

MAXIMUM SORTIES: 7 APPROX HOURS: 9.1

Task		PAGE
24.	Mission Profile will include:	III-48
	a. ITO	
	b. Instrument departure	
	c. All required checklist items, procedures and radio calls	
	d. Straight and level	
	e. Change of A/S	
	f. CAS climb and descent (climb can be done on departure)	
	g. Turns to headings	
	h. Steep turns	
	i. Unusual attitudes	
	j. Vertical S	
	k. Confidence maneuvers	
	l. RMI only area to VOR	
	m. VOR holding, penetration low approach and missed approach	
	n. Radar approach and missed approach	
X	FINAL CRITERIA	III-49

NOTE: Wind direction and velocity will be posted each morning at the trainer and in the briefing room. Winds will approximate the actual wind conditions for that day; they may be changed as necessary to enhance drift corrections learning/instruction.

Advancement from Block V to the aircraft will be determined by how soon the student meets the final advancement criteria on all tasks.

BLOCK V - MISSION PROFILE

Instr Unit	Tasks	Maximum	Approx
T25XX	24	Sorties	Hours
		7	9.1

TASK 24: MISSION PROFILE

- TNR COND: Active runway

- OBJECTIVE: Student plans and flys an instrument mission profile

- STU REQ:
  - PREFLIGHT
    - How will the winds affect your mission?
    - How do you plan to compensate for the wind?
  - INFLIGHT
    - The student will practice planning, flying, and accomplishing the procedures required in the mission profile.

- IP INST:
  - Vary the mission as necessary to prepare the student for the aircraft check ride. Strict adherence to the profile is necessary in the early portion of Block V, i.e., maybe the student would benefit from repeating the departure or shooting two VOR approaches, etc. This is the student's first try at VOR work while flying a diversified mission.
  - Point out how to bring the navigation instruments into the normal crosscheck. Be sure the student doesn't get hung up on the navigation instruments in his crosscheck.
  - Introduce extraneous radio chatter and unusual (real world) deviation from departure and arrival.

- MIN REP: None

- ADV CRIT: See Final Criteria

- XCK: N/A

- REF:
  - Learning Center P2607, All of Advanced Instruments (Part I); Local Area Procedures manuals on instrument departure, arrival and area operating procedures.

FINAL CRITERIA

ITO: Heading (±3°) Rotation (5° momentary deviation of +1° for 2 sec) Gear up (positive rate of climb 100-110K) Flaps (light out in handle 110-125K)

*CLIMB TO 180 KIAS: VVI (+300 to+1300')

*180K CAS CLIMB: A/S (±4K) Heading (±3°) VVI (+1000 to +3500') Course (±3° on CDI)

*T.O. CLIMB 10M to 15M: A/S (±5K) Heading (±3°) VVI (+1000 to +3000')

LEVEL-OFFS: Alt (±100') A/S (±4K) Heading (±3°) Leadpoint (3-15% of VVI) Time (hold parameters for one min after power change initiating level-off)

CHG OF A/S: Alt (±100') A/S (±4K of target airspeed) VVI (±400') Heading (±3°) Time (hold parameters for 30 sec after speedbrake is raised or power is changed to hold new A/S)

CONSTANT A/S DESCENT: A/S (±4K) Heading (±3°) VVI (-500 to -3000')

TURN TO HEADING: Alt (±100') A/S (±4K) VVI (±400') Time (must remain parameters for 30 sec after wings level in rollout).

STEEP TURNS: Altitude (±125') A/S (±6K) VVI (±600') Time (180° of turn each direction).

VERTICAL S: "A" - A/S (±4K) transition altitude (±150') VVI (±300') Heading (±3°) Time (1 climb and descent). "D" - add bank angle (30° ±2°), delete heading requirement.

AILERON ROLL: A/S 200-230 for entry, smooth roll rate, nose through horizon ±2°

WINGOVER: A/S 200-230 for entry, 90° bank prior to nose through horizon, wingtip remains on horizon, pitch 19° high/low ±2°

UNUSUAL ATTITUDE: Student recognizes aircraft attitude as demonstrated by proper pitch, bank and power movements on recovery (no false starts). Minimum loss of attitude. No stall.

*Williams Air Force Base only.

RMI ONLY RECOVERY FROM AREA TO VOR:

- Sets up appropriate intercept
- Intercepts and maintain inbound course (±4°)
- Identifies position at pickup fix (±4°)
- Aircraft control Alt (±125') A/S (±6K)

HOLDING

- Accomplish entry procedures without false starts.
- Accomplish holding procedures without false starts.
- A/C control, Alt (±125') A/S (±5K).

PENETRATION

- Establishes proper heading to intercept outbound course (±5°)
- Intercepts course (±3°) before penetration turn
- A/S (±8K)
- Level-off at 9M (-100' +200')
- Intercept and maintain course (±4°)

LOW APPROACH: A/S (120 ±5K) Turns proper distance to intercept outbound course (±5°). Level off at Alt (±100') A/S (±5K)

MISSED APPROACH: Initiates missed approach ±10 sec of planned time. No procedural errors. 160K (±4K) RPM 90% (±3%) Level-off altitude (±100') A/S (±5K).

RADAR PATTERN UP TO FINAL: Alt (±125') A/S (±5K) Heading (±3°) level-offs Alt (-75 +125)

RADAR FINAL: A/S (108K to 115K) Heading (±3°) Alt before G.S. (-50 +100)

RADAR GLIDE SLOPE: A/S (180K to 115K) VVI (0 to -1000'), Heading (±3°)

T-37 INSTRUMEN FLYING TRAINING

Special Instructions

1. Each sortie will be flown as a typical mission profile unless weather or student needs dictate a need for a deviation.

2. Instrument takeoffs will be composite (unhooded).

3. The student should be progressed to his I2690 check ride as soon as he demonstrates his consistent ability to accomplish the mission profile in a satisfactory manner. Proficiency advancement applies.

4. All six I21XX rides must be flown unless the student has progressed to the point where his next ride should be I2690.

Instr Unit	Title and Objectives	Sorties Dual/Solo	Approx Hours
I21XX	MISSION PROFILE I 1. The student will PRACTICE: a. ITO b. Instrument departure c. Climb d. Level off e. Airspeed Control f. Altitude Control g. Heading Control h. 30° turns to headings i. Constant A/S Climbs & Descents j. Change of A/S k. Use of Trim l. Vertical S m. Steep turns n. Confidence maneuvers o. Unusual attitudes p. Course interception (normal and RMI only) q. Maintaining course (normal and RMI only) r. Holding s. Penetration t. Low approach u. Missed approach v. Radar approach w. Missed approach (radar) x. ATC voiceprocedures 2. At the end of this instructional unit the student must have	6	7.8

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Instr Unit	Title and Objectives	Sorties Dual/Solo	Approx Hours
	achieved a satisfactory level of performance on maneuvers c thru o above 3. Special syllabus requirements. The student will be DEMONSTRATED spatial disorientation maneuvers as prescribed in AFM 51-37.		
I22XX	MISSION PROFILE II 1. The student will PRACTICE all the maneuvers previously practiced as necessary to insure accomplishment of Block objectives. 2. At the end of this instructional unit the student must have achieved a satisfactory level of performance on ALL maneuvers previously practiced.	5	6.5
I2690	INSTRUMENT CHECK The student will demonstrate a satisfactory level of performance on a representative cross section of maneuvers previously performed.	1	1.3

T-37 NAVIGATION TRAINING

Special Instructions

1. T2701 is a practice navigation mission taught in conjunction with Flight Planning and is a prerequisite for N2201. It will be flown in the instrument trainer and conducted by an Instructor Pilot. Profile of flight to include voice procedures will be designed by local academic sections.

2. The VFR pilotage mission will be conducted only over local preflown and approved routes which are fully coordinated with other agencies concerned. VFR hemispheric altitude between 3000 - 7000 feet AGL will be flown. (ATCM 51-4 restrictions apply.)

3. A dual overnight cross-country mission is authorized and encouraged when practicable. This mission will include a minimum of four sorties. Lesson I2102 will be completed prior to Lesson N2201. The following restrictions and special instructions apply:

   a. All legs will be filed and flown under Instrument Flight Rules.

   b. Weather conditions and other circumstances permitting, one leg will be flown via the low altitude Victor Airways system, and will use FLIP low altitude instrument approach procedures.

   c. Each sortie flown will be graded separately.

4. N2301/02 will be flown as a day/night out and back mission to enhance the student's instrument/navigation proficiency; it will only be flown as an additional requirement to fulfill total phase time after the final check ride.

Instr Unit	Title and Objectives	Sorties Dual/Solo	Approx Hours
T2701	FLIGHT PLANNING 1. The student will practice: a. ATC clearance, departure, position reporting and terminal voice procedures b. Navigation between 2 VOR stations with an intermediate intersection reporting point c. Use of FLIP terminal chart for strange field VOR approach. 2. Special Syllabus Requirements. The student will practice: a. Use of high and low altitude enroute charts b. Use of MB-6 computer to revise estimates and compute actual ground speed c. Maintenance of flight log to include monitoring of fuel consumption	1/0	1.5
N2101	VFR NAVIGATION (ORIENTATION) 1. The student will practice: a. VFR flight planning b. Pilotage navigation (1) Identification of check points (2) Maintaining course by ground distance (3) Estimating ground distances (4) Course corrections c. VFR position reports d. VFR arrival procedures	1/0	1.4
N2201 | 04	IFR NAVIGATION (DUAL OVERNIGHT OR DUAL LOCAL) 1. The student will practice: a. Planning a flight b. Departure c. Determining position by ground reference (if in VMC) d. Use of navigational aids e. Use of computer in revising estimates f. ATC voice procedures g. VOR navigation (1) ARTC procedures (2) Departure (3) Enroute procedures (4) Approach procedures h. Arrival procedures i. Emergency navigation procedures j. Precision approach	4/0	5.6

Instr Unit	Title and Objectives	Sorties Dual/Solo	Approx Hours
	2. At the end of this Instructional Unit the student must have achieved a satisfactory level of performance on all navigation procedures introduced except: a. Lost procedures b. Emergency navaid use c. Loss of bearing pointer 3. The student will be briefed on the decompression effects of high altitude flight		
N2301	IFR NAVIGATION (DUAL DAY/NIGHT OUT AND BACK)	2	2.8
02	1. The student will practice navigation procedures previously practiced, as required. 2. Special syllabus requirement. The student will be briefed on and practice strange field VFR arrival procedures.		

T-37 FORMATION TRAINING

Special Instructions

1. Formation flying will be conducted in flights of two aircraft.

2. Training will ensure that students receive equitable flying time in lead and wing positions.

3. Students will receive a minimum of six hours dual instruction prior to solo. The solo sortie will be flown under the supervision of the instructor pilot who flew the preceding dual formation sortie.

4. Solo students are restricted to a maximum of 40° bank turns and to right turn rejoins only. Solo students will fly the lead position on takeoff.

5. F2401 will only be flown as an additional requirement to fulfill total phase time after the final check ride.

Instr Unit	Title and Objectives	Sorties Dual/Solo	Approx Hours
F2101	FAMILIARIZATION 1. The student will be DEMONSTRATED and/or PRACTICE: a. Ground operations b. Formation takeoff (wing or lead) c. Proper power control d. Fingertip formation (wing and lead) (1) Straight and level (2) Shallow level turns (3) Straight climbs and descents e. Climb and level off f. Inflight checks g. Position change h. Speed brake operation i. Air discipline including aggresiveness and smoothness j. Radio procedures k. Emergency procedures l. Visual signals m. Lead responsibilities including clearing, flight planning and wingman consideration	1/0	1.3

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Instr Unit	Title and Objectives	Sorties Dual/Solo	Approx Hours
	n. Letdown and traffic entry (wing or lead) o. Pattern and landing 2. The instructor may DEMONSTRATE aircraft capability to remain in position up to 90° of bank through a range of airspeeds (ATCM 51-4 restrictions apply). 3. Special Syllabus Requirement. The student will be DEMONSTRATED the effects of wingtip vortices and recovery techniques.		
F2201 04	FUNDAMENTALS 1. The student will PRACTICE: a. Maneuvers and procedures previously introduced b. Shallow and medium bank climbing and descending turns c. Crossunders d. Pitchouts and rejoins e. Procedures for leaving and rejoining formation, including recovery from rejoin overshoot 2. The instructor may DEMONSTRATE (at altitude) formation straight-in approach and go-around procedures (minimum airspeed 120 knots) 3. At the end of this Instructional Unit the student must have achieved a satisfactory level of performance in all formation procedures introduced except wing takeoff and traffic entry.	4/0	5.2
F2301 02	FORMATION PRACTICE (DUAL/SOLO) 1. One sortie in this Instructional Unit will be flown solo 2. The student will practice formation procedures previously introduced, as required.	1/1	2.6
F2401	FORMATION PRACTICE 1. The student will practice formation procedures previously introduced, as required.	1/0	1.3

APPENDIX 2: FLOW CHART; REGULAR VS TEST SYLLABI